



## CL-Technology GmbH

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## CL SATIN NICKEL

### Properties:

In contrast to bright nickel, the **CL Satin Nickel** electroplating process produces uniform satin/dull, decorative, fine crystalline nickel deposits, even on polished base materials. The surface is almost non-dazzling. The resistance against finger printing and scratching is excellent. The deposited nickel layer may be top coated without any problem. Different colour effects can be achieved with chrome, antique nickel, black nickel, black chrome and gold.

## PRODUCTS AND BATHMAINTENANCE

Three processes are available:

- |                               |  |
|-------------------------------|--|
| a) CL Satin nickel additive 1 | has a fine grained structure           |
| b) CL Satin nickel additive 2 | offers a more coarse surface structure |
| c) CL Satin nickel additive 3 | gives a "lacquered look a like"finish  |

The three finishes are inter-changeable within the same solution.

The equipment and plating procedures required to successfully operate **CL Satin Nickel** vary only slightly from traditional bright nickel.

### MAKE-UP FOR 100 L

<b>CL Satin Nickel</b> Carrier K	2,0 l.
<b>CL Satin Nickel</b> Carrier M	0,6 l.
CL Satin nickel additives 1, 2 or 3	0,03 l.

The satin effect in the **CL Satin Nickel** bath is solely dependent upon the additive concentration. Additions greater than those listed above are not recommended.

### A) Preparation of additives prior to addition

**CL Satin Nickel** Carrier M and Carrier K may be added directly to the plating bath without dilution. The CL satin nickel additives 1,2 or 3 must be diluted in the ratio 1 : 30, with DI-water, mixed well and then added slowly with thorough stirring.

Bankverbindung : Stadt – Sparkasse Solingen, BLZ 342 500 00, Konto nr. 5353248

HRB 5025 Amtsgericht Solingen. Ust-ID-Nr. DE 813 359 241

Geschäftsführer : Uwe Lüttke

### B) Addition of additives

A combination of CL Satin nickel additives 1 and 2 and 3 can be added to the bath. The total additive concentration must not exceed 1.0ml/litres. The single components must be added separately. DO NOT MIX. Prior to addition of the CL Satin nickel additive 1 or 2 or 3 the brightener carriers K and M must be homogeneously mixed in the electrolyte.

### C) Caution

The addition of other brighteners must be strictly avoided. In addition, no wetting agents may be added to the electrolyte or dragged in from other plating baths. DI water should be used for rinsing prior to **CL Satin Nickel**. The pH should be adjusted with additions of 10% sulphuric acid or nickel carbonate.

### OPERATING CONDITIONS:

- Bath density at 20° C	1.292 g/cm <sup>3</sup> (approx. 32,5° Be)
- pH value	4,1 – 4,5
- Temperature	50 – 60°C (122 – 140° F) preferred temperature is 52°C (125° F) even during idle time.
- Cathode current density	3 – 8 A/dm <sup>2</sup> (30 – 80 A/ft <sup>2</sup> ) preferred range 4 – 6 A/dm <sup>2</sup> (40 – 60 A/ft <sup>2</sup> )
- Anode current density	1 – 3 A/dm <sup>2</sup> (10 – 30 A/ft <sup>2</sup> )
- Voltage	8 – 10 Volt
- Anodes	S-rounds or pure (99,7%) nickel anode
- Rectifier	ripple < 5
- Plating time	1 µm/min. at 5 A/dm <sup>2</sup> , 10 – 15 minutes to obtain uniform satin/dull effect. Satin finish requires 8 – 10 µm.
- Agitation	cathode rocker arm agitation 2 – 3 m/min. with a bump.
- Filtration	Daily after finishing plating operation using 5 µm filter cartridges. Four times solution volume per hour for 8 hours. ABSOLUTELY NECESSARY. Filtration during operation is not possible Filtration removes the additive

- Current free entry

When hanging cathodes in tank current free time should not exceed 10 seconds. Uniform dull deposits and good adhesion can only be obtained with a short current free time cycle.

## COMPOSITION OF BATH

	Optimal	Range
Nickel	105 g/l	105 - 110 g/l
Chloride	10 g/l	7 - 13 g/l
Boric acid	40 g/l	37 - 42 g/l
Carrier K	20 ml/l	15 - 22 ml/l
Carrier M	6 ml/l	4 - 10 ml/l
Satin additives 1,2 or 3	0,3 ml/l	0,2 – 1.0 ml/l

The Satin additives 1, 2 and 3 must be diluted 20 fold with DI water prior to addition. Upon initial make-up and with the start of each shift, the addition of the Satin additives 1, 2 or 3 should be made 0.5 hour prior to insure complete mixing of the additive materials.

### Consumption values

Carrier K  
Carrier M

### Per 10.000 Ah

0,5 – 1,5 l.  
0,8 – 1,7 l.

Carrier M and K are reduced through electrolysis. They are not removed by filtration. Excessive quantities of Carrier K or Carrier M have little effect. Low concentration of either carrier will reduce the satin/dull effect.

For **CL Satin Nickel**, the higher the additive concentration, the higher the satin/dull effect. To maintain a uniform finish, additives can be added during operation. Additions of approx. 1/15 to 1/8 of the make-up quantity should be made every hour to assure uniform appearance. These quantities are only an approximation.

Each installation will have its own addition rate based on impurity levels, pH and temperature. Operator experience will determine actual schedule.

The CL Satin Nickel additive is not reduced by electrolysis but by time, which means that before a complete "coagulation" takes part the solution has to be filtered which has to be done mostly after 8 to 10 working hours.

After filtration the CL Satin Nickel additive has to be added again.

### Nickel Content

Nickel metal values within the recommended range will have little influence on the satin/dull effect. At nickel concentrations below 100 g/l, the satin effect and throwing power are reduced.

### **Chloride Content**

Chloride levels above the recommended range will result in bright, non dull deposits. Low levels of chloride have no influence on the deposit.

### **Boric Acid Content**

No influence on the satin/dull effect.

### **Carbon Treatment**

Normally not required. Decomposition products are removed with daily Filtration. Carbon treatment is normally required only if organic contaminations are dragged into the electrolyte.

### **WASTE TREATMENT**

The effluent from CL Satin nickel contains heavy metal compounds. Rinse water and spent electrolytes should be disposed of according to local regulations.

### **WARRANTY**

Seller makes no warranty, whether of merchantability, fitness or otherwise, expressed or implied, concerning the product other than it shall be of the specifications stated herein. Any recommendations made by Seller concerning the use of the product are believed to be reliable, but seller makes no warranty of the results obtained. Buyer agrees to inspect the product supplied hereunder immediately after delivery. Failure to give notice in writing as aforesaid within the specified time constitutes an unqualified acceptance of the product and a waiver of all claims with respect thereto.